

REVISIONS

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SHEET REVISION STATUS

SH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
REV	A	A	A	A	A	A														
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ORIGINATOR:
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DATE
9/14/90

FSC: 5930

APPROVED:
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9/14/90

Switches, Thermostatic,
General Requirements for

CODE 311 APPROVAL:
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

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1.0. SCOPE

1.1 Purpose

This specification establishes the general requirements for thermostatic switches intend for use in space environments. The purpose of this document and the detail specification (paragraph 3.1) is to specify additional screening inspections (e.g., pre-cap visual, 100% Group A inspection, and run-in testing) which are not required by the MIL-S-24236 specification.

2.0 APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

MIL-STD-20 - Test Methods for Electric and Electrical Component Parts

MIL-S-24236 - Switches, Thermostatic (Metallic and Bimetallic), General Specifications for

3.0 REQUIREMENTS

3.1 GSFC Detail Specification. The individual item requirements shall be specified herein, and in accordance with the applicable specification herein, and in accordance with the applicable specification sheet, or source control drawing (SCD). In the event of any conflict between requirements of this specification and the detail specification sheets, the latter shall govern.

3.2 Workmanship. The switches shall be processed in such a manner as to be uniform in quality, and shall be free from cracked or displaced parts, sharp edges, burrs and other defects which will affect life, serviceability, or appearance.

3.3 Particle Impact Noise Detection (PIND). Switches, thermostatic, shall be PIND tested in accordance with the Elmwood Sensors in-house process specification along with accept/reject criteria, PS2236, which as been approved by GSFC. (GSFC shall be notified of any proposed changes or revisions to the approved specification.)

3.4 Test Reporting and Data Recording. A test results summary sheet shall be supplied along with the successfully screened parts. Records of actual test data on all screened parts shall be retained by the test facility for a period of three years and shall be made available for inspection to the procuring activity within that duration if so requested.

3.5 Internal (Pre-cap) Visual Inspection. A 100% pre-seal visual inspection shall be performed. If Millipore cleaning and inspection is specified in accordance with paragraph 3.1 of this specification, it shall be done following the 100% pre-seal visual inspection.

The internal visual inspection shall be performed using appropriate magnification (10X minimum). The purpose of this examination is to detect faulty workmanship and extraneous

particles or materials that are not a required functional part of the mechanism. This examination shall be made on the header assembly, disc, and case, and shall be made from all views necessary to ensure the absence of contamination from contacts and crevices. In addition, the following is required:

- There shall be no evidence of case distortion, which could impair operation of the switch. Any damage or indentation of the weld rim or disc seating surfaces shall be a cause for rejection. There shall be no evidence of blistering, or flaking of the nickel or gold plating from either the base or terminal posts.
- Transfer pins or insulators that have sharp peaks, cracks, or loose flaking shall be rejected.
- There shall be adequate clearance around moving parts, and adequate spacing or proper insulation of insulated electrical parts.

3.6 Millipore Cleaning and Inspection (when specified). Switches, thermostatic, shall be subjected to Millipore cleaning and inspection prior to insertion into their enclosures. Millipore cleaning and inspection shall be in accordance with the Elmwood Sensors in-house process specification along with accept/reject criteria, PS2229, which as been approved by GSFC. (GSFC shall be notified of any proposed changes or revisions to the approved specification.)

3.7 External Visual and Mechanical Examination. The switches shall be examined to verify that the workmanship, configuration and dimensions are in accordance with paragraphs 3.1 and 3.2 herein.

3.8 Run-in (Pre-Acceptance conditioning). When the switches are tested as specified in paragraph 4.4, there shall be no evidence of intermittent contact operation.

3.9 Vibration (when specified). The requirements and test method shall be in accordance with MIL-S-24236, unless otherwise specified in the detail specification.

3.10 Calibration. When the switches are tested as specified in MIL-S-24236 quality conformance inspection calibration method for switches, the operating points for the opening and closing temperatures shall be within the tolerances specified (see 3.1).

3.11 Creepage. The test method and requirements shall be in accordance with the MIL-S-24236.

3.12 Seal. The test method and requirements shall be in accordance with MIL-S-24236.

3.13 Dielectric withstanding voltage (DWV). The test method and requirements shall be in accordance with the MIL-S-24236.

3.14 Contact resistance. The test method and requirements shall be in accordance with the MIL-S-24236.

3.15 Insulation resistance. The test method and requirements shall be in accordance with the MIL-S-24236

3.16 Particle Impact Noise Detection (PIND), (when specified). When the switches are tested in accordance with paragraph 3.3 herein, there shall be no evidence of particulate contamination.

3.17 Part Number. The manufacturer shall establish a unique part number which reflects all the requirements of this specification.

3.18 Date Code Identification. Each thermostat shall be identified by a date code that shows the year and the week of manufacturer.

3.19 Part Marking. Each thermostat shall be marked with the part number and date code established under 3.17 and 3.18.

3.20 Plating. Platings which are known to sublime in a hard vacuum such as cadmium or zinc shall not be used. Finishes shall be free from breaks, scratches, and other defects which will reduce the serviceability of the parts.

4.0 QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspecting. Unless otherwise specified, the manufacture is responsible for the performance of all qualification, screening, and quality specification. GSFC reserves the right to reinspect thermostatic switches and to designate representatives for in-plant surveillance and acceptance functions in connection with procurement of thermostatic switches to this and the detail specification.

4.2 Qualification. The switches supplied to this specification shall be subjected to the qualification requirements of MIL-S-24236.

4.3 Group A Inspection. The switches shall be subjected to 100% Group A screening inspection per Table I in the order shown.

4.4 Run-in. The switches shall be operated for a minimum of 500 consecutive total cycles (one cycle constitutes one closure and one opening of the switch contacts). The switch shall be switched between temperatures 20 ± 5 °F above the maximum actuating temperature and 20 ± 5 °F below the minimum actuating temperature. The switch cycling rate is to be a maximum of one complete cycle in five minutes to a minimum of one complete cycle in one hour. The contacts shall switch a load of 6 ± 1 Vdc @ 100 ± 25 mA. This test shall be monitored to verify the proper switch function.

Table I

Test No.	Test Description	Reference Documents	
		Requirement	Test Methods
1	Internal Visual (Pre-seal) inspection	Para. 3.5	Para. 3.5
2	Millipore cleaning and Inspection 1/	Para. 3.6	Para. 3.6
3	External visual and mechanical examination	Para. 3.7	Para. 3.7
4	Run-in	Para. 3.8	Para. 4.4
5	Vibration 1/	Para. 3.9	MIL-S-24236
6	Calibration	Para. 3.10	MIL-S-24236
7	Creepage	Para. 3.11	MIL-S-24236
8	Seal	Para. 3.12	MIL-S-24236
9	Dielectric Withstanding Voltage (DWV)	Para. 3.13	MIL-S-24236
10	Contact Resistance	Para. 3.14	MIL-S-24236
11	Insulation Resistance	Para. 3.15	MIL-S-24236
12	Particle Impact Noise Detection (PIND) 1/	Para. 3.16	Para. 3.3

Notes:

1/ These tests shall be performed only when specified in the detail specification sheet or SCD.

5.0 PREPARATION FOR DELIVERY

5.1 Packaging. Each switch shall be individually packaged and sealed in a dust-free moisture proof container. Each switch shall be protected within the package to the extent that the normal handling will not cause damage to the switch.

6.0 NOTES

6.1 Data Address. When supplemental data, reports, or information requests are to be transmitted to GSFC, the following address shall be used, unless otherwise specified.

Parts Branch, Code 311
Goddard Space Flight Center
Greenbelt, Maryland 20771

6.2 For Thermostatic Switches. The detail specification or SCD should specify the following:

- a. Title number and date of this specification.
- b. A part number which uniquely identifies the part
- c. Internal (Pre-cap) visual inspection per applicable reference document.
- d. Millipore cleaning and inspection per applicable reference documents.
- e. Any deviations from calibration, environmental or electrical test requirements of this specification.
- f. Specify PIND or vibration testing, if required.

6.3 Qualification Provisions. With respect to products requiring qualification, awards will be made only for products which have been approved by GSFC before the time set for opening of bids. The attention of the supplier is called to this requirement; manufacturers should arrange to have qualification tests made on products which they propose to offer to GSFC to become eligible for awards contracts or orders for products covered by this specification. Information pertaining to qualification of products may be obtained from the activity whose address is listed in 6.1.

6.4 Notice. When GSFC drawings, specification, or other data are used for any purpose other than in connection with a definitely related GSFC procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; the fact that GSFC might have formulated, furnished or in any way supplied the said drawings, specification, or other data is not to be regarded by implication or otherwise in any manner licensing the holder or any person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

6.5 Definitions. Definitions of terms shall be in accordance with DOD-C-24621 and EIA-455 specifications and procedures

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